CLAIMS

[1]   An image combining system comprising:

an imager device for dividing a subject into a plurality of partial images, and photographing the partial images;

a conversion parameter estimation unit for estimating a geometric

5   conversion required for a combination between the partial images, and calculating image conversion parameters for the geometric conversion;

a storage unit for storing the partial images and the calculated image conversion parameters corresponding to the partial images;

an image combination data retrieval unit for selecting partial

10   images required for generating a mosaic image, and retrieving the selected partial images and image conversion parameters corresponding thereto from said storage unit, respectively;

an image combination unit for geometrically converting photographed partial images on the basis of a current partial image using the

15   partial images and image conversion parameters retrieved by said image combination data retrieval unit, combining them to generate a mosaic image, and generating image data for displaying the current partial image and at least part of the mosaic image; and

a display device for displaying an image in accordance with the

20   image data generated by said image combination unit.

[2]   The image combining system according to claim 1, further comprising an overall optimization unit for optimizing each image conversion

parameter so as to maintain the consistency of the geometrical conversion and combination among all the partial images.

[3]   The image combining system according to claim 1, further comprising a super resolution image generation unit for generating an image at a resolution higher than the mosaic image.

[4]   The image combining system according to claim 1, wherein said image combination unit generates image data for placing the current partial image over the entire screen of said display device, and displaying a mosaic image generated from the current partial image and the photographed partial images in a portion of the screen at a reduced scale.

[5]   The image combining system according to claim 4, wherein said image combination unit generates image data for highlighting a circumscribed rectangle of the current partial image present in the mosaic image.

[6]   The image combining system according to claim 4, wherein said image combination unit generates image data for displaying an area within the mosaic image in which the partial image does not exist with a particular pixel value.

[7]   The image combining system according to claim 4, wherein said image combination unit generates image data for scrolling and displaying the

mosaic image, or displaying the same at a reduced scale when the current partial image is positioned outside the mosaic image, such that the current partial image fits in the mosaic image.

[8]   The image combining system according to claim 1, wherein said image combination unit generates image data for placing the current partial image at the center of the screen of said display device, and displaying a combination of the photographed partial images included in a predetermined range centered around the current partial image.

[9]   The image combining system according to claim 1, wherein said image combination unit generates image data for placing the current partial image over the entire screen of said display device, and displaying and highlighting a portion overlapping with the photographed partial images.

[10]   The image combining system according to claim 9, wherein said image combination unit generates image data for displaying the overlapping portion with the photographed partial images in a color which is varied in accordance with the number of overlapping partial images.

[11]   An image combining method for combining a plurality of partial images separated from a subject and photographed by an imager device to generate a mosaic image for display on a display device, said method comprising:

estimating a geometric conversion required for a combination

between the partial images, and calculating image conversion parameters for the geometric conversion;

accumulating the partial images and the image conversion parameters calculated in correspondence to the partial images in a storage unit, respectively;

selecting partial images required to generate a mosaic image, and retrieving the selected partial images and image conversion parameters corresponding thereto from said storage unit;

geometrically converting photographed partial images on the basis of the current partial image using the retrieved partial images and image conversion parameters, and combining them to generate a mosaic image; and

generating image data for displaying the current partial image and at least part of the mosaic image on said display device.

[12]   The image combining method according to claim 11, further comprising executing overall optimization processing for optimizing each image conversion parameter so as to maintain the consistency of the geometrical conversion and combination among all the partial images.

[13]   The image combining method according to claim 11, further comprising executing super resolution image generation processing for generating an image at a resolution higher than the mosaic image.

[14]   The image combining method according to claim 11, comprising:

generating image data for placing the current partial image over the entire screen of said display device, and displaying a mosaic image generated from the current partial image and the photographed partial

5   images in a portion of the screen at a reduced scale.

[15]   The image combining method according to claim 14, comprising:
generating image data for highlighting a circumscribed rectangle of the current partial image present in the mosaic image.

[16]   The image combining method according to claim 14, comprising:
generating image data for displaying an area within the mosaic image in which the partial image does not exist with a particular pixel value.

[17]   The image combining method according to claim 14, comprising:
generating image data for scrolling and displaying the mosaic image, or displaying the same at a reduced scale when the current partial image is positioned outside the mosaic image, such that the current partial

5   image fits in the mosaic image.

[18]   The image combining method according to claim 11, comprising:
generating image data for placing the current partial image at the center of the screen of said display device, and for displaying a combination of the photographed partial images included in a predetermined range

5   centered around the current partial image.

[19]   The image combining method according to claim 11, comprising:

generating image data for placing the current partial image over the entire screen of said display device, and displaying and highlighting a portion overlapping with the photographed partial images.

[20]   The image combining method according to claim 19, comprising:

generating image data for displaying the overlapping portion with the photographed partial images in a color which is varied in accordance with the number of overlapping partial images.

[21]   A program for causing a computer to execute processing for combining a plurality of partial images separated from a subject and photographed by an imager device to generate a mosaic image for display on a display device, said program causing the computer to execute:

5   processing for estimating a geometric conversion required for a combination of the partial images, and calculating image conversion parameters for the geometric conversion;

processing for accumulating the partial images and the image conversion parameters calculated in correspondence to the partial images in

10   a storage unit, respectively;

processing for selecting partial images required to generate a mosaic image, and retrieving the selected partial images and image conversion parameters corresponding thereto from said storage unit;

processing for geometrically converting photographed partial

15   images on the basis of the current partial image using the retrieved partial

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images and image conversion parameters, and combining them to generate a mosaic image; and

processing for generating image data for displaying the current partial image and at least part of the mosaic image on said display device.

[22] The program according to claim 21, further causing the computer to execute overall optimization processing for optimizing each image conversion parameter so as to maintain the consistency of the geometrical conversion and combination among all the partial images.

[23] The program according to claim 21, further causing the computer to execute super resolution image generation processing for generating an image at a resolution higher than the mosaic image.

[24] The program according to claim 21, causing the computer to execute processing for generating image data for placing the current partial image over the entire screen of said display device, and displaying a mosaic image generated from the current partial image and from the photographed partial images in a portion of the screen at a reduced scale.

[25] The program according to claim 24, causing the computer to execute processing for generating image data for highlighting a circumscribed rectangle of the current partial image present in the mosaic image.

[26]   The program according to claim 24, causing the computer to execute processing for generating image data for displaying an area within the mosaic image in which the partial image does not exist with a particular pixel value.

[27]   The program according to claim 24, causing the computer to execute processing for generating image data for scrolling and displaying the mosaic image, or displaying the same at a reduced scale when the current partial image is positioned outside the mosaic image, such that the current

5   partial image fits in the mosaic image.

[28] .   The program according to claim 21, causing the computer to execute processing for generating image data for placing the current partial image at the center of the screen of said display device, and displaying a combination of the photographed partial images included in a predetermined

5   range centered around the current partial image.

[29]   The program according to claim 21, causing the computer to execute processing for generating image data for placing the current partial image over the entire screen of said display device, and displaying and highlighting a portion overlapping with the photographed partial images.

[30]   The program according to claim 29, causing the computer to execute processing for generating image data for displaying the overlapping portion with the photographed partial images in a color which is varied in

accordance with the number of overlapping partial images.

ABSTRACT

A data processing unit calculates image conversion parameters corresponding to each partial image, geometrically converts photographed partial images on the basis of a current partial image based on the calculated image conversion parameters, and combines them to generate a mosaic image. Also, a display device displays each current partial image, and at least part of the generated mosaic image.

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